

Dear Associate Director,

I am writing to you today to discuss the investigation of customer churning for our power company. As you know, customer churn is a major problem for our industry, and we need to take steps to reduce it.

I have outlined four key steps in this investigation:

**1. Identify the key factors of customer churning.** Based on my research, I believe that the following factors are most likely to lead to customer churning:

- a. **Pricing:** High rates and sudden change in rates of the service.
- b. **Service quality:** Poor customer service, outage management, technology advancement, or contract terms.
- c. **Competition:** Other company offered a better package (lower rates, Rewards program, etc...).
- d. **Relocation:** Customer moved to a new location outside the service area of the company.
- e. **Renewable energy:** Lack of renewable energy options.

**2. Define the data frame.** The data frame should include the following information for each customer:

a. **Rows:**

Each row should represent a unique customer with all corresponding features mentioned in the columns.

b. **Columns:**

- |  |  |
|--|--|
| 1) Customer ID                             | 2) Age   |
| 3) Gender                                  | 4) Location                                    |
| 5) Income                                  | 6) Household size                              |
| 7) Tenure                                  | 8) Payment patterns                            |
| 9) Payment methods                         | 10) Number of overdue payments                 |
| 11) Contract fees                          | 12) Contract length                            |
| 13) Contract terms                         | 14) Reliability metric                         |
| 15) Average usage per month                | 16) Usage peak time                            |
| 17) Churning history                       | 18) Average change of price per month          |
| 19) Average Response time                  | 20) Average outage time                        |
| 21) Average outage frequency               | 22) Renewable energy options                   |
| 23) Technological advancement tools        | 24) Competitor average price                   |
| 25) Competitor average number of complains | 26) Competitor average reliability metric      |
| 27) Competitor renewable energy options    | 28) Competitor Technological advancement tools |
| 29) Churn Status                           |  |

**3. Identify the data sources and fields that could be used to explore the contribution of various factors to a customer's possible action.** The following data sources could be used to explore the contribution of various factors to a customer's possible action:

a. **Customer data:**

- i. **Demographics:** Age, gender, location, income, household size.
- ii. **Tenure:** How long has customer been with the company?
- iii. **Payment History:** Payment patterns, methods, and overdue payments.
- iv. **Contract details:** Contract terms, fees, length.
- v. **Interaction:** Customer service calls, feedback, complaints.

- vi. **Usage:** consumption patterns, peak consumption time, average consumption.
  - vii. **Churn history:** whether customer churned before or at risk of churning.
  - b. **Company data:**
    - i. **Pricing data:** Current and historical pricings.
    - ii. **Service quality metrics:** Outage duration and frequency, response time, reliability meter.
    - iii. **Renewable energy:** Availability of renewable energy programs.
    - iv. **Contract details:** Contract terms, fees, length, and incentive programs.
    - v. **Technological advancement:** availability of more advancement meters and monitoring tools.
  - c. **Competitors data:**
    - i. **Pricing data:** Current and historical pricings.
    - ii. **Service quality metrics:** Outage duration and frequency, response time, reliability meter.
    - iii. **Renewable energy:** Availability of renewable energy programs.
    - iv. **Contract details:** Contract terms, fees, length, and incentive programs.
    - v. **Technological advancement:** availability of more advancement meters and monitoring tools.
  - d. **Market data:**
    - i. **Market trends:** Overall customer churn rate within market.
    - ii. **Regulations:** Energy policies that could affect customer churn.
4. **Perform exploratory data analysis.** The following exploratory data analysis techniques could be used to identify the factors that are most likely to lead to customer churning:
- a. **Descriptive Statistics:** Calculate the statistical summary (mean, median, std, etc....) of numerical features of churned and non-churned customers to identify any significant differences.
  - b. **Data Visualization:** Visualization as histograms, bar charts, and box plots to visualize the distribution differences between churned and non-churned customers to make comparative analysis between them.
  - c. **Time Series Analysis:** Analyze historical pricings, service quality metrics and renewable energy options over time to identify patterns that could help us or change churn behaviors.
  - d. **Correlation Analysis:** Compute correlation coefficient (Pearson coefficient) to analyze relations between features.
  - e. **Customer Feedback Analysis:** Analyze customers complaints, customer service calls, and satisfaction surveys to identify problems that could be solved and help us to change churn behaviors.
  - f. **Feature importance:** Determine features that affect the churn behavior (Using Machine Learning techniques) the most to help us focus on those features instead of focusing on more features.
  - g. **Customer Segmentation:** Create Customer Segments to help us launch our suitable tailored precautionary measures to face the churn possibilities of certain segments based on their features.

I believe that this investigation will help us to identify the factors that are most likely to lead to customer churning. This will allow us to take steps to reduce customer churn and improve our customer retention.

Thank you for your time and consideration.

Sincerely,  
Abdelrahman Akmal